DOCUMENT RESUME

ED 127 480 CE 007 806

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TITLE Elementary School Industrial Arts. A Synopsis of Programs in Minneapolis Schools.
NOTE 12p.

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Curriculum Design; Curriculum Development; *Elementary School Curriculum; *Industrial Arts; Program Descriptions; Program Design; School Administration; *School Shops

ABSTRACT

This paper is addressed to elementary school principals and teachers who wish to pursue the possibility of having an industrial arts program in their school. Benefits of the program to children and safety practices are discussed. Five program models currently used in Minneapolis are detailed briefly. The five model types are: classroom, prep time, special education, interest centers, and technology centers. As a guide to setting up a program, a list of general suggestions is provided for hand tools, materials, and equipment needed. (TA)

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ELEMENTARY SCHOOL INDUSTRIAL ARTS

A Synopsis of Programs in Minneapolis Schools

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ELEMENTARY SCHOOL INDUSTRIAL ARTS

This paper is presented in the hope that you and your staff will become interested enough in elementary school industrial arts to pursue the possibility of having it in your school. The rewards to children are great. The ensuing pages contain the benefits to children, safety, various models in existence, a list of materials, tools and equipment needed, and how you can receive any help you may need.

Here is what they say about elementary school industrial arts:

Students:

" . . . . Because you can make things and keep them for a long time and I like machines and materials. And I made a stove and a dresser and a letter 'M' and a table and a pencil holder and a letter holder and that is why I enjoy it."

" . . . . I like the power tools to work with."

" . . . . I like woodworking because I can make things for my Mom and make presents for other people. I like all the ideas and tools that we can work with and learn about."

" . . . . Because you use wood and plastic instead of paper. And then you can paint them if you want to."

Parent:

"Both of my children have enjoyed industrial arts because it makes them feel so grown up."

"My two boys have really enjoyed industrial arts. I think they like school better because of it. I know they stay after school whenever they can for 'shop'."

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Principal:

"Industrial arts at Pratt School continually ranks among the most popular programs with students, staff and families at Pratt School. The program is a fine example of the kind of integration which allows children to apply the basic skills of math and reading to projects which teach manipulative skills as well. In fact, it is as good an example of the 'whole child' approach as can be found--in a warm, caring atmosphere, children learn to cooperate, feel good about themselves and use big muscles in the completion of their activities--a fine blend of the cognitive, affective and pyschomotor domains."

Elementary Teacher:

"As a teacher, I think our woodshop is great! Even the parents have commented on how happy they are that their children get this kind of experience. The children are always excited to go and always very proud of what they have built. Our woodshop allows the children to do something completely different from the classroom experience. It is a rare and wonderful chance for elementary children."

Brief Description of the Industrial Arts Program at the Elementary School Level

The industrial arts program at the elementary school level emphasizes materials and processes. Students work with materials such as wood, metals, plastic and leather, and develop such processes as cutting, bending, forming, shaping, fabrication, fastening, finishing, etc. Safety is a primary concern; safety procedures are taught so that students develop good safety habits. The motivation of students is extremely high because children love to work with tools and machines and as a result, gain the many benefits that are described below:

Benefits to Students

The same rationale used for any good educational experience can be used

for elementary school industrial arts.

1. Students gain in self-confidence because of:

   The visible success of making something to take home and be proud of.

   Successful experiences with machines.

   Creativity: They can design their own projects.

2. Students gain social skills througn:

   Cross-age teaching.

   Cooperation in designing and producing a product.

3. Students gain in language arts and math through:

   Concrete experiences involving mathematical concepts such as space, shape, weight, balance, symmetry, volume, etc.

   Concrete experiences involving mathematical operations involved in planning, designing, measuring, and constructing.

   Communication of instructions and designs by speaking/listening and writing/reading.

4. Students gain in science skills through:

   Observations of qualities of materials and tools.

   Experiences with the operation of machines.

   Problem solving.

5. Students gain a broader understanding of careers through:

   Proper and safe use of materials, tools and equipment.

   Actual experiences relevant to many kinds of jobs.

   A model of work which is free from sex stereotyping.

   Introduction to technology.

Safety:

Industrial arts programs for elementary students naturally raise the question of safety. That concern is uppermost in the minds of persons

setting up and operating such programs, with the result that industrial arts has an excellent safety record. There are probably no more band-aids used in the shop of an elementary school than you use in your home. Students are given instruction in the use of the equipment and are required to wear safety goggles when operating each piece of equipment. No student is expected to operate a machine he or she does not want to operate, and no student is allowed to operate those pieces of equipment (the table saw, for instance) which are considered dangerous. Machines are treated like any other vehicle of instruction, not as strange objects that should be avoided because they might attack without warning.

Program Models:

Five models in current use in Minneapolis schools will be discussed: classroom, prep time, special education, interest centers, and technology centers. Variations exist in each of the programs to accommodate individual school differences and needs. Each program utilizes wood as its basic material, though other materials such as plastic, leather, fabrics, and metals are sometimes introduced. A large variety of projects are produced including such things as toys, math and other games, home products, classroom aids, cages, experimental equipment, etc. Students are taught the proper and safe methods of using material, tools and equipment.

Suggested tools, equipment, materials, and hints as to how you can begin your program are found at the end of this paper.

Classroom: Lake Harriet, Lowry, Minnehaha, Bremer

This program is discussed first because of the ease in which it can be implemented. Either a small area of the classroom can be used or a vacant classroom set up to accommodate a teacher and his or her class. This approach has the advantage of excellent coordination between industrial arts and the other disciplines being taught. It has the disadvantage of lack

of skill by many elementary teachers in working with tools and materials. This can be easily corrected by in-service and the use of aides or assistants with tools and skills.

Other advantages of this program are: It can be continually upgraded by additional tools, materials, etc. as they become available or expanded as space becomes available.

It can easily be transformed into an interest center, prep-time activity or as a part of the technology center.

A typical setting would include various handtools, scrap materials and a workbench with a couple of vises. Given this setting and the opportunity, students can have a worthwhile successful experience and will produce a wide variety of projects.

Going first class is nice but GOING is the most important part of the program.

Prep Time: Shingle Creek, Seward, Webster, Kenwood

The above schools utilize industrial arts activities to free their classroom teachers for prep time. This approach requires a certified industrial arts teacher, a room large enough to accommodate a complete class and the necessary tools and equipment. Combined with other activities such as physical education, media center, art, pottery, etc., it offers an excellent variety to students. Provided space is available in each building, sharing present teacher with another building would give both schools additional flexibility. At the present time, this model appears to be the easiest to implement because funds are available for prep-time teachers. In order to provide the best possible experience for students, it is

recommended that additional help be given to the instructor. There are many ways of doing this--i.e., regular aides, older students, junior or senior high school students, volunteers, NYC students, etc.

Woodworking is the primary activity, but graphics, plastics, metals and leather are also used on occasions. Student motivation and interest are maintained by the wide variety of projects possible with wood and the natural progression from simple projects to the more difficult as skills are obtained.

Special Education Schools--Emerson, Hamilton, Madison, Lyndale

This is the oldest model in operation in Minneapolis. It is set up primarily for special education students with the other students rotating through as time permits. It also requires a certified industrial arts teacher and separate room. It carries the added advantage of state reimbursement of the teacher's salary. For years, special education has recognized the benefits of industrial arts to special students. The kind of hands-on success oriented activities that special education students need is the basis of elementary school industrial arts.

Interest Centers--Pratt, Tuttle, Marcy, Jefferson, Harrison, Field

The interest center is a relatively new approach to elementary school industrial arts. The S.E.A. schools have utilized it for the past five years with a great deal of success. Variations of this program do exist in other schools of the city and seem to be gaining in popularity because of its flexibility. Schools that have divided their day into basic skills and activity time have found that industrial arts is one of the most popular activities offered. These schools have also found that they can offer a worthwhile experience with a

limited amount of tools, equipment and materials to begin with and then build on them as funds or equipment become available. The additional advantage of an interest center program is that no advanced skills are needed by the instructor if only basic hand tools and relatively safe machines are used such as the drill press, hand sanders, scroll saw, etc.

Activities vary from individual projects such as gages, science experiments, math games, to whole class projects such as designing and building a cube.

Interest centers function best when the number of students doing the activity can be held to about 12-15.

Technology Center--Lincoln, Lyndale

The technology center consists of an area within the confines of the elementary complex which involves students in industrial arts (manufacturing), marketing (selling), home economics (consumerism), and office experiences. This model is the most extensive in existence and perhaps involves the greatest effort to establish; however, it has the advantage of offering a total life-like experience to the students. Students follow a product from its inception (design) to its conclusion (in the hands of the consumer) with all the production, operating costs, distribution, etc. problem solving that takes place in between.

Setting up an elementary school industrial arts program:

The cost of equipping each of the models varies tremendously from a few simple hand tools in the classroom to much more sophisticated equipment in the technology center. Rather than go into detail in this paper as to each piece of equipment needed in each program, we will deal with

general suggestions and helpful hints. A more extensive list of equipment and their costs is available from the Industrial Arts Department, Minneapolis Schools.

Hand Tools:

Various methods of obtaining hand tools have been used:

1. Have children bring them from home.
2. Extra tools from junior and senior high schools.
3. Donations from individuals, companies, P.T.S.A., etc.
4. Purchase as needed.

It is quite surprising how few hand tools are really needed and how many can be purchased for $50.00 to $100.00. Taken care of, tools and equipment will last indefinitely.

Materials:

Many of the materials needed are readily available from existing school supplies, tempra paint, brushes, glue, etc. Wood is available from mill works, manufacturing plants, lumber yards, etc. A notice sent home with children usually produces many useable pieces of wood. Also, $50.00 worth of pine and plywood will last quite some time. However, a regular budget should be established for materials. If the program is valuable enough to have, it should have adequate supplies.

Below is a partial list of various materials needed:

Nails, 2D, 3D, Brads, 1", 1-1/4", 1-1/2"

Screws, various sizes

Sandpaper, 80, 100, 150 grit

Screw eyes - small

Brass hooks

Drill bits 1/8", 3/16", 1/4", 5/16"

Dowel rods 1/8", 3/16", 1/4", 5/16"

Wood 1/4", 3/8" plywood, pine, bass

Blades, coping, scroll

Stain and varnish

NOTE: Avoid hard woods such as maple, oak, etc. It is too difficult for young people to drive nails into and to saw, etc.

Recommended Hand Tools:

This is a basic list. Numbers of each will vary according to size of room and number of students involved. Purchase additions as needed. All tools are stocked by the Supply Department.

Hammers, claw, 13 oz.

Cross cut saw

Coping saws - extra blades

Hand drill

Files, round, half round, square

Screw drivers - various sizes

Pliers

Surforms

Compass

Rulers

Square

Brace - bits 1/2", 3/4", 1"

Adjustable wrench

Vise grip

Tin snips

"C" clamps

Block plane

Equipment:

Equipment is classified in two ways--those pieces students can use and those for the instructor's use only.

Listed below is equipment recommended for students' use and in the order in which these should be purchased:

Benches and vises

Drill press - electric hand drill

Scroll saw - sabre saw

Disc sander and vacuum -orbital sander

Additional equipment for older students' use:

Band saw

Uniplane

Lathe

Equipment for instructor's use:

Table saw

Jointer

NOTE: Equipment is expensive but when you take into consideration the length of time it will last, the cost per pupil over a period of years is minimal.

FINAL NOTES:

Schools that have industrial arts facilities, find that they are also a very popular extended day and community school activity. In all surveys taken, parents and students in S.E.A. have continually ranked elementary school industrial arts as one of the most popular activities in the schools. The main emphasis in each program should be student success. It is very important that the student is pleased with what he or she does and, therefore, feels good about himself.

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